

Diagnosis Frequency of Diabetes Mellitus after Glucose Screening Tests During Pregnancy and Determination of the Risk Factors Related with Diabetes Mellitus

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Abstract:

Aim and method: This study was carried out to determine the diagnosis frequency of diabetes mellitus after glucose screening tests of the pregnant women in Cumhuriyet University Research and Application Hospital Maternity Clinic, and to determine the risk factors related with diabetes mellitus, using cross-sectional and descriptive research methods. The study sample consists of 30 pregnant women in their 24-28th gestational week, who had registered in Cumhuriyet University Maternity Hospital within the period of 27 January-28 March. A survey form, consisting of 23 questions, prepared to determine the diabetes mellitus-related risk factors, was used for data collection in addition to the 50 g and 100 g glucose screening test results, and the survey forms were completed during face to face interviews with the pregnant women. 30 pregnant women were evaluated in terms of the risk factors (nutrition, first pregnancy, DM history of family, weight of the first-born child, BMI, etc.) and the evaluation was supported with glucose screening test results.

Findings: 76.7% of the women were within 20-30 age group, 46.7% were university or higher education graduates, and 53.4% were housewives. It was found that, 56.7% of patients took nourishment from all nutrition groups; 56.6% were having their first gestation; and 86.8% underwent no abortus case. 50 g test values of 28 patients (93.4%) are lower than 140 mg/dl, and those of 2 patients (6.6%) are higher than 140 mg/dl. Only 2 people were subjected to 100 g glucose screening test based on 50 g test result. One of each two patients was diagnosed with gestational diabetes according to the results of 1, 2 and 3 hour 100 g tests applied in preprandial state. In the present study, among 30 patients, one of 30 women with 25.0-29.9 BMI (overweight), one of 10 patients whose family has a diabetes history, one of 29 women whose first-born child weighted 2500-4300 g, and one of 4 women who has an abnormal vaginal secretion history, were diagnosed with gestational diabetes.

Results and Suggestions: It is suggested that as a routinely conducting 50 gr glucose test in 24.-28. pregnancy weeks.

Keywords: Pregnancy, Gestational Diabetes Mellitus, Risk Factors, Glucose Screening

I. Introduction

Diabetes mellitus (DM) is a disease characterized with hyperglycemia which occurs as a result of absolute or relative deficiency, or insufficient secretion of insulin hormone. Gestation is a diabetogenic case, and 3-12% of all pregnancies are affected by diabetes mellitus or gestational diabetes mellitus (GDM), which develops during gestation (Gilbert and Harmon, 2011; Cetin, 2012; Taskin, 2016). Advanced age maternity (Inan et al., 2014), BMI>30kg/m², diabetes history of family, macrosomic birth history (4500 g and higher) GDM history of previous birth and ethnicity (South Asia, Black Caribbean and Middle East) (Gregory and Todd, 2013) are among the risk factors for GDM.

Early diagnosis of GDM during gestation is crucial due to the maternal complications (spontaneous abortus risk, vascular issues, preeclampsia-eclampsia, polyhydramnios, frequent urinary infections, birth traumas, increase in diabetic complications, etc.), fetal complications (congenital malformation, macrosomia or retarded growth, macrosomia related intrauterine death or birth traumas, etc.), and neonatal complications (hypoglycemia, respiratory distress syndrome, hyperbilirubinemia, polycythemia, etc.) induced by gestational diabetes mellitus (Odar et al. 2004; Canbaz and Dincag, 2010). Therefore, gestational diabetes mellitus diagnosis is made with glucose tolerance screening (GTS) within 24-28th weeks of gestation. Pregnant women are diagnosed with GDM in case any value within the test results exceeds the threshold value (Cakir, 2014). No consensus has been established so far for DM screening and diagnostic approach, and debates as to the routine

application, screening period, the applied test, threshold values used in the application, and as to whether the test should be conducted in one or two stages, still continues (Ozturk and Altuntas, 2014). In the single-stage approach; diagnostic test is applied with 2 hours OGST (Oral Glucose Screening Test) using 75 g glucose. In the first stage of the two-stage approach, screening is applied with 50 g glucose tolerance. Following the first stage, 3 hours OGST is applied on the ones with glucose >140 mg/dl after the first hour, with 100 g glucose for diagnosis (ACOG, 2013). If the pregnancy does not seem to be problematic and gestational diabetes risk is not too high, American Diabetes Association recommends the application of glucose screening test within the 24.-28th weeks of gestation.

Having an anatomically, physiologically and biochemically normal pregnancy is essential in terms of both perinatal and maternal mortality and morbidity. Accordingly, the present study was carried out in an attempt to determine the diagnosis frequency of diabetes mellitus after glucose screening tests performed during pregnancy, and to determine the DM-related risk factors for pregnant women.

II. Method

This study was carried out to determine the diagnosis frequency of diabetes mellitus after glucose screening tests of the pregnant women in Cumhuriyet University Research and Application Hospital Maternity Clinic, and to determine the risk factors related with diabetes mellitus, using cross-sectional and descriptive research methods. Population of the study consists of 69 women, registered in Cumhuriyet University Research and Application Hospital Maternity Clinic between the dates of January 27 – March 28 2003 and subjected to OGST. Among these patients, 30 pregnant women in their 24-28th week of gestation that consented to participate in the study comprise the study sample. Data Collection: Research data was collected in two stages. A survey form including 23 questions prepared to determine the risk factors and completed during face-to-face interviews with patients, was used for data collection along with 50 g and 100 g glucose screening test results for gestational diabetes mellitus. Evaluation of Data: During 50 g glucose tolerance test; pregnant patients were given warm water with 50 g glucose after a light breakfast and afterwards 3 cc blood was drawn from them. 100 g glucose tolerance test was applied, if the test result after the first hour exceeded 140 milligram/deciliter. Patients were asked to stay hungry before 100 g glucose tolerance test. First, preprandial blood glucose was measured and after giving the patients 100 g warm water including 100 g glucose, the values after first, second and third hours were checked. After OGST, the survey forms, prepared to determine the DM related risk factors, were completed by the researchers for the patients with preprandial values higher than 95-105 mg/dl, first hour values higher than 180-190 mg/dl, second hour values higher than 155-165 mg/dl and third hour values higher than 140-145 mg/dl, and the collected data was evaluated using SPSS 14.0 software package.

III. Findings

76.7% of the women were within 20-30 age groups, 46.7% were university or higher education graduates, and 53.4% were housewives.

Table 1: Distribution of the Nutrition and Obstetric Histories of the Sample

Nutrition and Obstetric History	Quantity	%
Main Nutriments		
All nutrition groups	17	56.7
Vegetable-fruit	9	30.0
Fatty foods	1	3.3
Pastry	3	10.0
Number of Gestations		
1	17	56.6
2	8	26.7
3	2	6.7
4 and higher	3	10.0
Number of Abortus		
None	26	86.8
1	2	6.6
2	2	6.6
3 and higher	-	-
Total	30	100

It was found that, 56.7% of patients took nourishment from all nutrition groups; 56.6% were having their first gestation; and 86.8% underwent no abortus case (Table 1).

Table 2: Distribution of 50 and 100 g Glucose Test Results

Test Results	Quantity	%
For 50 g (n=30)		
Under 140 mg/d	28	93.4
140 mg/dl	-	-
Over 140 mg/d	2	6.6
For 100 g (n=2)		
Preprandial		
Under 95 mg/dl	1	50.0
95- 105 mg/dl	1	50.0
Over 105 mg / dl	-	-
1st Hour		
Under 180 mg/dl	1	50.0
180-190 mg/dl	1	50.0
Over 190 mg/dl	-	-
2nd Hour		
Under 155 mg/dl	1	50.0
155-165 mg/dl	1	50.0
Over 165 mg/dl	-	-
3rd Hour		
Under 140 mg/dl	1	50.0
140-145 mg/dl	1	50.0
Over 145 mg/dl	-	-

As seen in Table 2; 50 g test values of 28 patients (93.4%) are lower than 140 mg/dl , and those of 2 patients (6.6%) are higher than 140 mg/dl. Only 2 people were subjected to 100 g glucose screening test based on 50 g test result. One of each two patients was diagnosed with gestational diabetes according to the results of 1, 2 and 3 hour 100 g tests applied in preprandial state.

Table 3: Comparison of Some Characteristics of Pregnant Patients Based on 100 G Test

Characteristics	GDM (+)		GDM (-)		Total	
	Quantity	%	Quantity	%	Quantity	%
BMI						
18.5 ↓ (weak)	0	0	2	6.6	2	6.6
18.5- 24.9 (normal)	0	0	24	80.1	24	80.1
25.0- 29.9 (overweight)	1	3.3	3	10.0	4	13.3
30 ve ↑ (morbid obesity)	0	0	0	0	0	0
Total	1	3.3	29	96.7	30	100
Family Diabetes History						
With	1	3.3	9	29.7	10	45.6
Without	0	0	20	67.0	20	54.4
Total	1	3.3	29	96.7	30	100
Weight of the First Born Child						
2500 gr ↓	0	0	1	3.3	1	3.3
2500-4300 gr	1	3.3	28	93.4	29	96.7
4300 gr ↑	0	0	0	0	0	0
Total	1	3.3	29	96.7	30	100
Abnormal Vaginal Secretion History						
With	1	3.3	3	9.9	4	13.2
Without	0	0	26	86.8	26	86.8
Total	1	3.3	29	96.7	30	100

In the present study, among 30 patients, one of 30 women with 25.0-29.9 BMI (overweight), one of 10 patients whose family has a diabetes history, one of 29 women whose first-born child weighted 2500-4300 g, and one of 4 women who has an abnormal vaginal secretion history, were diagnosed with gestational diabetes (Table 3).

IV. Discussion

During gestation, it is essential for mother to properly adapt herself to the changes in her body and to take healthy and balanced nourishment for proper growth and development of the baby (Samur, 2008). İrge et al (2005) reported that 66.8% of pregnant patients took proper nutrition, and 18.8% underwent nutrition-related problems. In the study conducted by Nogay (2011), fruits (by 47.1%) and milk-yoghurt (42.9%) were found as the main products consumed by pregnant patients. In the present study, 56.6% of pregnant patients were found to take nourishment from all nutrition groups, and 30% were found to take vegetable-fruit based nourishment. Along with the previous studies, results of the current study indicate that pregnant women do not take sufficient and balanced nourishment during their gestational period.

Patients are diagnosed with gestational diabetes when their 50 g Glucose Tolerance Test first hour blood glucose value exceeds 140 mg/dl. (İnan et al 2014). In their study, Aydin et al. (2013) conducted 50 g

glucose test on 502 pregnant patients in their 24-28th gestational weeks, and reported 29 positive results. According to the following 100 g glucose test, one third of pregnant patients (n=13) were diagnosed with GDM. In their research, Sagun et al. (2008) performed 50 g glucose test on 426 pregnant patients in their 24-28th gestational weeks and obtained 62 positive results. 4 patients were diagnosed with GDM after the 100 g glucose tests conducted on these 62 pregnant patients. In the present research, 2 people were diagnosed with GDM according to 50 g test results, and only 1 person was diagnosed with GDM according to 100 g test result.

ADA's recommendation is towards application of glucose screening test only on the patients with risk factor due to its economic burden. According to ADA's definition, the risky pregnant group comprises of: people with BMI higher than 25 kg/m², older than 25 years old, whose family has a diabetes history and people with malignant obstetric history (ADA, 2004). In their research comparing the properties of patients with and without GDM diagnosis, Mardi and Lutfi (2012) reported that pregnant patients diagnosed with GDM had 27.9±4.9 kg/m² body mass index, and their family had diabetes and urinary system infection history. In their study, Khan et al. (2013) reported that pregnant patients diagnosed with GDM had 28.03±2.89 kg/m² BMI and their family had diabetes history. In the present study, the first-born child of a pregnant diagnosed with GDM according to 100 g glucose test results weighed 2500-4300 g, her BMI is 25.0-29.9 kg/m², her family has diabetes history and she has abnormal vaginal secretion history. Previously conducted studies and the results of the present research show that application of screening tests on pregnant women, who are under risk according to GDM screening results, is crucial in terms of maternal/fetal and neonatal morbidity and mortality.

V. Conclusions And Recommendations

After the conducted research, glucose screening tests in pregnancy were found to have adequate diagnosis of diabetes mellitus. Therefore, as a routinely conducting 50 gr glucose test in 24.-28. pregnancy weeks is recommended.

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